



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/784,977	02/16/2001	Seiya Takahashi	14328	3787

7590 07/03/2003

Paul J. Esatto, Jr.
Scully, Scott, Murphy & Presser
400 Garden City Plaza
Garden City, NY 11530

EXAMINER

GORDON, BRIAN R

ART UNIT	PAPER NUMBER
----------	--------------

1743

DATE MAILED: 07/03/2003

6

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Applicati n No.

09/784,977

Applicant(s)

TAKAHASHI ET AL.

Examin r

Brian R. Gordon

Art Unit

1743

-- The MAILING DATE of this communicati n appears on the cover sheet with the correspondence address --

Period f r Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 February 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disp sition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 2-16-01 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Specification

2. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 11-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to claims 11-12 it is unclear what is meant by the phrase "the driving member is made a member for".

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Art Unit: 1743

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-3, 5-6 are rejected under 35 U.S.C. 102(e) as being anticipated by Feygin US 5,957,167.

Feygin discloses a method that is carried out using a micro volume liquid dispenser that includes, as a liquid carrier, a plurality of fluid-dispensing members. Each fluid-dispensing member comprises two opposed surfaces in spaced relation to one another and suitably configured for aspiring and holding (liquid holding member) a small volume of liquid via capillary action. Each fluid-dispensing member retains and delivers a liquid volume within the range of about 0.5 to about 5 microliters. The present micro volume liquid dispenser further includes an actuator (driving member) for moving/accelerating the fluid-dispensing members and for stopping/abruptly decelerating the fluid-dispensing members. The actuator can use a biasing member, such as a spring, for accelerating the fluid-dispensing members, and a "stop" for abruptly decelerating the fluid-dispensing members. Alternatively, the actuator can utilize more sophisticated pneumatic, hydraulic or electrodynamic systems. As noted above, abruptly decelerating moving fluid-dispensing members causes retained liquid to issue therefrom. Such dispensed liquid can be directed toward, and received by, an intended receiver.

As seen in the figures the end of the holding member tapers in a direction toward the deposition substrate.

Art Unit: 1743

As to claim 1, although the claim is an apparatus claim, it is unclear how the liquid is held within the holding member but the liquid dispensed is "on" the holding member. There is no antecedent basis within the claims for the liquid held on the holding member.

It is noted that claims 5-6 and 9 are in the form of method steps and do not further limit the structure of the claims that they depend upon. The claims are directed to process steps in which the device is used in a particular manner, which are not accorded patentable weight in claims directed to the apparatus.

As to claim 1, for the purpose of examination the claim has been interpreted as a device comprising a liquid holding member and driving member that moves the holding member backwards and forwards.

7. Claims 1-10 and 13-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Shalon et al. US 6,309,891.

Shalon et al. disclose a printing system comprising a pod, a detachable printing device, a substrate, a positioner and a preservation device, wherein (a) the pod comprises a receptacle for reversibly attaching an attachment portion of the printing device; (b) the printing device comprises a reservoir containing a liquid comprising a predetermined agent and in fluid connection with the reservoir, a capillary comprising an axial bore having proximal and distal openings to ambient pressure and a printing tip comprising the distal opening and which prints the agent on the substrate; (c) the positioner moves the pod relative to the substrate; and (d) the preservation device is

Art Unit: 1743

within, containing or in contact with the printing device and preserves the capability of the printing device to print the agent on the substrate over long-term storage.

Suitable printing devices include any structural member which combines by fluid connection the requisite reservoir and capillary. For example, the printing device may simply be a capillary comprising a liquid-filled bore having a proximate reservoir portion and terminating at a distal portion comprising the printing tip. Alternatively, the reservoir may comprise a more voluminous non-capillary liquid filled chamber having a relatively larger internal diameter in fluid connection with a capillary comprising the printing tip.

The reservoir portion of the printing device is adapted to contain and contains a liquid comprising a predetermined agent. The device may be made of any convenient and compatible material. For example, suitable capillary fabrication material ceramic, silicon, glasses, etc. The printing device is adapted or adaptable to contain, store and/or print a wide variety of liquids, including aqueous liquids, liquids comprising organic polar solvents such as alcohols, DMSO, acetonitrile, etc., nonpolar solvents such as benzene, chloroform, etc.

Suitable positioners include any device which provides the requisite positioning of the printing device to effect the desired printing sites on the substrate. Frequently, the positioner will provide a first positioning within the two-dimensional plane of the substrate surface and a second positioning perpendicular to the surface to effect contact printing on the surface. The positioner is generally electromechanically operated by a computer controlled robot.

The invention provides methods of making, using and storing the subject systems including methods for printing liquids comprising agents or analytes on substrates with the printing systems, particularly printing methods which comprise the step of decelerating the capillary to move the liquid through the bore, out the tip and onto the substrate. A wide variety of methods may be used for loading and/or unloading the printing devices, including passive capillary loading and unloading from the printing tip, vacuum-assisted unloading, active pressure purging, etc.

Referring to FIG. 20, a printing device 11 is shown in fluid connection through tubing 181 with a sample reservoir 201.

Again, it is noted that claims 5-6 and 9 are in the form of method steps and do not further limit the structure of the claims that they depend upon. The claims are directed to process steps in which the device is used in a particular manner, which are not accorded patentable weight in claims directed to the apparatus.

As to claim 1, for the purpose of examination the claim has been interpreted as a device comprising a liquid holding member and driving member that moves the holding member backwards and forwards.

As to claims 1, 7 and 10, although the claims are apparatus claims, it is unclear how the liquid is held within the holding member but the liquid dispensed is "on" the holding member. There is no antecedent basis within the claims for the liquid held on the holding member.

8. Claim 1-3, and 7-14 are rejected under 35 U.S.C. 102(e) as being anticipated by Rose et al. US 6,551,557.

Rose et al. disclose a ceramic tip and a random access print head for the transfer of microfluidic quantities of fluid. The print head can randomly collect and deposit fluid samples to transfer the samples from a source plate to a target. The print head can also be programmed to create a direct map of the fluid samples from the source plate on the target or to create any desired pattern or print on the target. The tip and print head can be used for a wide variety of applications such as DNA microarraying and compound reformatting. In one preferred embodiment, the tip is used as a capillary or "gravity" pin to draw or collect source fluid and "spot" or deposit the fluid onto the target via physical contact (touch-off). In another preferred embodiment, the tip is used in conjunction with an aspirate-dispense system to actively aspirate source fluid and deposit the fluid via a contact or non-contact approach.

The contact transfer tip generally comprises a substantially cylindrical upper body portion, a substantially tapered lower body portion and a lumen cavity. The substantially cylindrical upper body portion has a first outside diameter. The substantially tapered lower body portion has a second outside diameter at a transition portion thereof which is substantially equal to the first outside diameter of the upper portion. The substantially tapered lower body portion further has a third diameter at a lower-most end thereof which is smaller than the first or second diameters and which approximately equals the diameter of a spot or dot of fluid desired to be deposited onto the target substrate.

In use, initially all the tips 200 (FIG. 3) are raised by energizing the solenoids 238. The print head 230 is positioned and aligned over the source 29 by utilizing the robot arm 252 and/or the movable platforms 254. For random access collection, a first

Art Unit: 1743

tip 200 is lowered by de-energizing or turning off the corresponding solenoid 238. The first tip 200 dips into a microwell of the source plate 29 to draw fluid by capillary action. The first tip 200 is raised by energizing the corresponding solenoid 238. Relative motion is provided between the source plate 29 and the print head 230, by the robot arm 252 and/or the movable platform 254, to align a second tip 200 with a corresponding microwell of the source plate 29. The second tip 200 is lowered and collects source fluid from the microwell. The second tip 200 is then raised. Subsequent tips 200 are lowered and raised in a similar manner. This random access collection process is continued until all the tips 200 are loaded with the sample fluid.

Referring to FIG. 7, the syringe pump 22 is connected to the reservoir 16 and the dispenser 12 using tubing 23 provided with luer-type fittings for connection to the syringe and dispenser. Various shut-off valves 25 and check valves (not shown) may also be used, as desired or needed, to direct the flow of fluid 14 to and/or from the reservoir 16, syringe pump 22 and dispenser 12.

In one form of the present invention a solenoid dispenser 12, schematically illustrated in FIG. 11, is preferred. Referring to FIG. 11, the solenoid valve dispenser 12 generally comprises a solenoid-actuated drop-on-demand valve 20, including a valve portion 34 and a solenoid actuator 32, hydraulically coupled to the tube or tip 200 of the present invention. The nozzle 214 of the tip 200 serves as the aspirating and dispensing nozzle. The solenoid valve 20 is energized by one or more electrical pulses 13 provided by a pulse generator 19 to open and close the valve 20 at a predetermined frequency and/or duty cycle. A detailed description of one typical solenoid-actuated valve can be

Art Unit: 1743

found in U.S. Pat. No. 5,741,554, incorporated herein by reference. The tip (FIGS. 1 and 7) of the present invention may also be used in conjunction with a number of other dispensers well known in the art for dispensing a liquid, such as a piezoelectric dispenser (deforms internal shape of the holding member), a fluid impulse dispenser, a heat actuated dispenser (device for adding thermal energy) or the like.

Conclusion


9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Popa-Burke et al., Fuerst et al., Tokiwa et al., Ganz et al., Roach et al., Papen (,187), Lewis et al., Baier, King et al., Scatizzi et al., Rao et al., Kalra et al., Komatsu, Lerch, Buhler, Tseung et al., and Nakazawa et al. disclose dispensing apparatuses.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian R. Gordon whose telephone number is (703) 305-0399. The examiner can normally be reached on M-F, with 2nd and 4th F off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on 703-308-4037. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.


Jill Warden
Supervisory Patent Examiner
Technology Center 1700

Application/Control Number: 09/784,977

Page 10

Art Unit: 1743

brg

June 24, 2003
